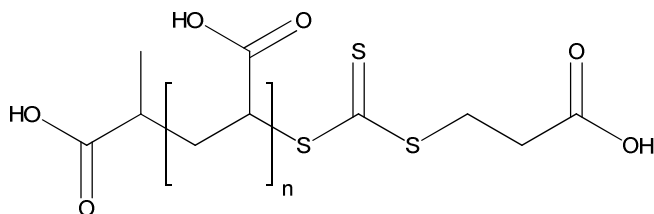


Sample Name:  
**Poly(acrylic acid) (by RAFT process)**  
 Sample #: **P14689-AA**

Structure:

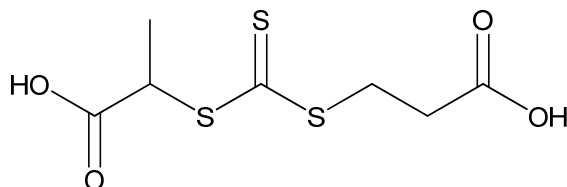


Composition:

|                      |     |
|----------------------|-----|
| Mw x 10 <sup>3</sup> | PDI |
| 172.0                | 1.2 |

Synthesis Procedure:

Polyacrylic acid was synthesized by RAFT polymerization of acrylic acid using 2,2'-azobis isobutyrate (CAS 2589-57-3) as initiator and xanthate as chain transfer agent:



Poly(acrylic acid) synthesized was then converted to its sodium salt for SEC.

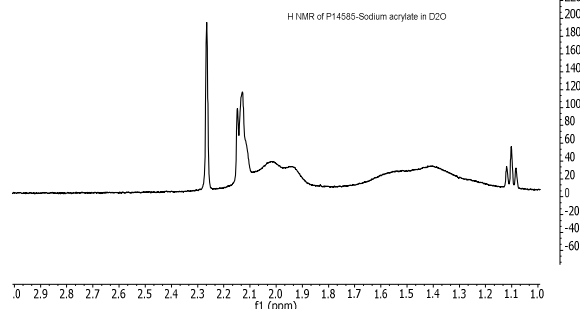
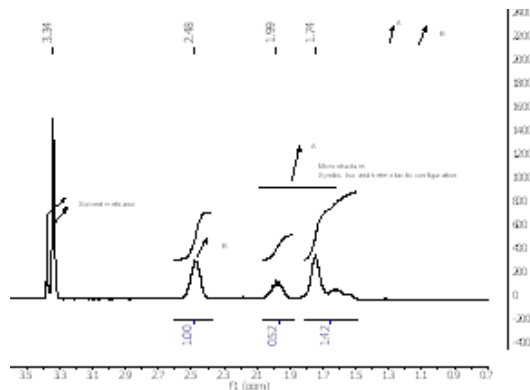
Characterization:

The molecular weight and polydispersity index (PDI) are obtained by size exclusion chromatography (SEC) in THF. For the analysis purposes of its molecular weights poly acrylic acid was converted to its n-butyl ester and characterized in THF on a Varian liquid chromatograph equipped with refractive and UV light scattering detectors. Three SEC columns from Supelco (G6000-4000-2000 HXL) were used with dual detectors model 270 from Viscotek Co.

Solubility:

Poly(acrylic acid) sodium salt is soluble in water.

**HNMR of the Poly acrylic acid run in CD3OD:**



**SEC of Homopolymer Precursor for the Sodium salt**  
**SEC of the Poly n Butyl acrylate after converting PAA to**  
**PnBuA for the determination of its molecular weights**

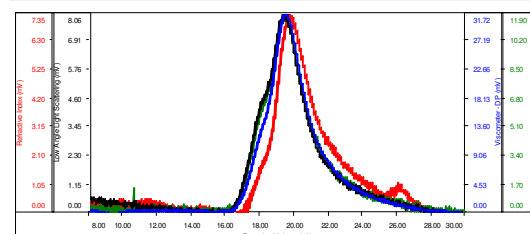
**Poly acrylic acid Mn on the basis of above characterization:**

**SEC analysis in H2O using an aqueous**

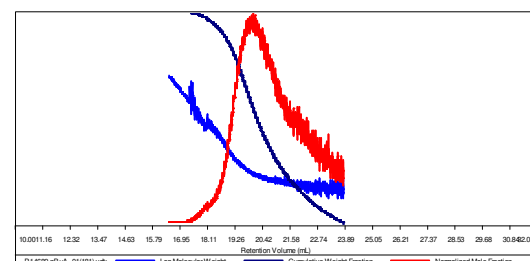
**buffer (NaHCO3 0.05 M, NaNO3 0.1 M, triethanolamine 0.02**

**Sample ID: P14689-nBuA**

|                       |                           |
|-----------------------|---------------------------|
| Concentration (mg/mL) | 0.8176                    |
| Sample dn/dc (mL/g)   | 0.0640                    |
| Method File           | PS80K-Feb25-2014-0000.vcm |
| Column Set            | 3x PL 1113-6300           |
| System                | System 1                  |



| Sample                  | Mn      | Mw      | Mp      | Mw/Mn | IV     |
|-------------------------|---------|---------|---------|-------|--------|
| P14689-nBuA_01(181).vdt | 306,366 | 366,545 | 333,843 | 1.196 | 2.3347 |



**References:**

1. Ph. Teyssie, Ph. Bayard, R. Jerome, **S. K. Varshney**, and J. S. Wang, *35th IUPAC International Union of Pure & Applied Chemistry International Symposium on Macromolecules* 1994, 67.
2. R. Fayt, R. Forte, C. Jacobs, R. Jerome, T. Ouhadi, Ph. Teyssie and **S. K. Varshney**, *Macromolecules*, 1987, 20, 1442-1444.
3. Jerome, R. Forte, **S. K. Varshney**, R. Fayt, and Ph. Teyssie, "The Anionic Polymerization of Alkylacrylates: A Challenge" in the Recent Advances in Mechanistic and Synthetic Aspects of Polymerization: M. Fontanille and A. Guyot Ed., NATO ASI Series C 215, 101 (1987), CA Vol. 108, 12, 094992.
4. Ph. Teyssie, R. Fayt, C. Jacobs, R. Jerome, L. Leemans, and **S. K. Varshney** *Am. Chem. Soc., Polym. Prepr.* 1988, 28, 2, 52-53